REMARKS

Claims 1 through 14 are pending in the application. Claims 1 has been amended to reflect that the aqueous NMMO spinning solution contains cellulose, at least one protein, and at least one filler. Support for this amendment can be found in the originally filed Application, for example on page 9, lines 10-13.

Claim 2 has been amended for clarity.

Clams 5 and 9 have been amended to include separate embodiments wherein the at least one filler comprises an organic filler or an inorganic filler, respectively. Support for this amendment can be found in the originally filed Application on p. 8, lines 8-11.

Claim 6 has been amended to reflect an embodiment wherein a desired organic filler has reduced solubility in the NMMO-spinning solution. Support for this amendment can be found in the originally filed Application on page 8, lines 8 through 11 and lines 12 through 17.

Claim 7 was amended to reflect an embodiment wherein a desired inorganic filler is insoluble in the NMMO-spinning solution. It would be clear to a person skilled in the art, upon reading the present specification, that preferred NMMO-insoluble fillers (see page 8, line 14) include pulverulent $CaCO_3$, $BaSO_4$, $CaSO_4$, SiO_2 or TiO_2. Claim 7 now depends from amended claim 9.

Claim 8 was corrected to overcome the objection of the informalities of the phrase "the granular filler" which had insufficient antecedent basis. Claim 8 has been reworded when the at least one filler is fibrous, the maximum dimension of a fibrous filler is up to 200 μm, and when the filler is granular, the size of granular filler particles is up to about 20 μm. Support for this amendment can be found on p. 7, lines 15-18. Claim 8 now depends from claim 1.

Claim 10 has been amended to now depend from claim 5.

Claim 14 has been amended to change the phrase "residual moisture" to "water content" to better conform with the specification on p. 12, lines 9-11.

1) The Examiner first rejects claims 1-5, 9 under 35 U.S.C. 102 over Weigel et al. Applicants respectfully submit that the claimed invention is patentably distinct from this reference.

The admixture of proteins used in cellulose-based tubular films produced by extruding an aqueous NMMO-spinning solution has long been problematic. One problem is that the admixture of proteins alone makes a tubular film inedible, while also reducing the strength of the film. It is therefore necessary to devise an additive which makes the film edible, for producing sausage skins and the like, while also interrupting the cellulose structure to reduce extensibility without significantly affecting strength of the film.

Unexpectedly, Applicants have found that the presence of at least one organic or inorganic filler within a NMMO-spinning solution containing cellulose and at least one protein produces cellulose-based tubular films exhibiting good edibility. More specifically, the use of such a filler imparts beneficial properties where the films are used as sausage casings with regard to an exact caliber constancy, e.g. uniform circumference and no creases, folds or wrinkles. In addition to the edibility, these sausage casings can be peeled off easily without damaging the sausage. The claims are thus directed to seamless cellulose-based tubular films produced by extruding an aqueous NMMO-spinning solution containing cellulose, at least one protein, and at least one filler. The resulting tubular film also comprises cellulose, at least one protein and at least one filler. The filler interrupts the cellulose structure and reduces extensibility of the film.

The addition of a filler alone to the NMMO-spinning solution does not solve the problem of providing a seamless edible cellulose-containing tubular film of constant caliber and without defects due to folds or creases. The invention solves this problem by providing both a filler and a protein together. If only the filler or only the protein are available, the cellulose-containing tubular film is not edible.

Applicants respectfully urge that Weigel et al. do not teach or suggest the presently claimed tubular film which incorporates cellulose, at least one protein, at least one filler at least one filler. Weigel et al. dissolve a mixture of cellulose with one or more proteins in a NMMO water system, and from this solution tubular films are produced (page 3, lines 1 through 5 of WO 01/45917). Their mixtures of wheat proteins with other proteins (page 4, lines 8-16) have been specifically used to be as *plasticizers* for the film (page 5, lines 14-17). This represents the antithesis of the claimed invention, wherein the inventive filler interrupts the cellulose structure and reduces the extensibility of the film, but *does not* plasticize the film.

The Examiner asserts that Weigel et al. do not disclose chemical modification or breakdown of the molecular chains; the protein is therefore soluble together with cellulose in oxides of tertiary amines without chemical modification or breakdown of the molecular chains. However, Weigel et al. provide no detail as to chemical modification or breakdown of the molecular chains. Applicants respectfully submit that Weigel et al.'s lack of description can not be used to infer that their protein is merely soluble in oxides of tertiary amines without chemical modification or breakdown of the molecular chains.

Accordingly, Applicants respectfully urge that Weigel et al. do not teach or suggest the recited tubular film, advantageously incorporating at least one filler. Rather, Weigel et al. strongly teach away from the presently claimed invention by using proteins to *plasticize* the film, and not to interrupt the cellulose structure and to reduce the film's extensibility, as required by the presently amended claim 1. For the above reasons, it is urged that claim 1 is patentably distinct from Weigel et al. and that this ground of rejection should be withdrawn.

With regard to dependent claims 2-5 and 9, Applicants respectfully assert that these claims are patentable over Weigel et al. together with claim 1. Specifically, regarding claims 3 and 4, the protein content in the film disclosed by Weigel et al. is said to vary between 1 and 80 wt% in relation to the proportion of solid matter in their film (page 5, lines 10-13). There is no teaching or suggestion in Weigel et al. which indicates what the "solid matter" in the film is, or whether this "solid matter" should be considered analogous to the "tubular film dry weight" as recited in the present claims 3 and 4 of the invention. Weigel et al. merely disclose that the proportion of the proteins in the film in relation to the proportion of solid matter in the film is 1 to 80 wt%. However, they are silent with regard to the protein content in relation to the film dry weight, as recited in the present claims 3 and 4. Again, such information cannot be inferred solely based on Weigel's lack of description.

With regard to claims 5 and 9, applicants urge that Weigel et al. do not disclose a filler as is required by the presently claimed invention. The protein disclosed by Weigel et al. is an organic material and is employed as a *plasticizer* of the cellulose. However, in no way is a filler used by Weigel to interrupt the cellulose structure and to reduce the extensibility of the film without weaken the film's strength. Thus, it is urged that this ground of rejection should be rescinded.

2) The Examiner next rejects claim 7 under 35 U.S.C. 103 over Weigel et al. in view of Hammer et al. (U.S. Patent 6,048,917). The arguments against Weigel et al. are repeated from above and apply equally here. Specifically, it is urged that Weigel et al. do not disclose a filler as discussed above. The Examiner agrees that Weigel et al. fails to disclose a filler comprising titanium dioxide. Thus, the Examiner attempts to fill this void by citing Hammer et al.

Hammer et al. teach a nonwoven fiber fabric whose fibers were bonded by a solution of cellulose in a mixture of NMMO and water and precipitation of the cellulose using an aqueous NMMO solution. Such a nonwoven fiber fabric is viscose-coated on one or both sides to produce a tubular food casing to be used as a sausage casing. In addition, to obtain colored sausage casings, color pigments such as carbon black or TiO_2 (titanium dioxide) can be present to color the cellulose layer.

Applicants urge that Weigel et al. do not suggest the coloring of a tubular film casing. Thus, there is no motivation for a person skilled in the art to use the TiO_2 pigments disclosed by Hammer et al. in the film casings of Weigel et al. Furthermore, such TiO_2 pigments are provided in Hammer et al. to *color* the tubular film casing, but there is no teaching in Hammer et al. to use their pigments as a filler for interrupting the cellulose structure of the film. In fact, the pigments are not mixed with the solution of cellulose in a mixture of NMMO-water, but instead are present in the viscose or cellulose layer which is coated on one or both sides of the nonwoven fiber fabric (see col. 3, lines 55 to57 and col. 6, lines 11 to 18). For these reasons, it is respectfully requested that this ground of rejection be withdrawn.

3) The Examiner next rejects claim 8 under 35 U.S.C. 103 as being unpatentable over Weigel et al. in view of Turbak et al. (U.S. Patent 3,833,022). The arguments against Weigel et al. are repeated from above and apply equally here. Specifically, it is urged that Weigel et al. do not disclose a filler as discussed above. The Examiner agrees that Weigel et al. fail to disclose a fibrous filler having a maximum dimension of up to 200 μm and a particulate filler having a particle size of up to 20 μm. Thus, the Examiner cites Turbak et al. in an attempt to fill this void.

Turbak et al. teach a fibrillar filler material of finely-divided wood pulp derivative of at least 99.5 % cellulose when dry (col. 5, lines 36-38). However, it is urged that the fibrous cellulose floc of Turbak et al. differs from the inorganic or organic fillers recited in the present claims. Applicants submit that there would have been no motivation for one skilled in the art to have looked to the filler material of Turbak et al., which differs from that of the present claims, and attempt to include such a fibrillar filler in the film casing of Weigel et al. in an effort to formulate the present claims. Applicants therefore respectfully urge that this ground of rejection should be withdrawn.

4) The Examiner next rejects claims 10 and 11 under 35 U.S.C. 103 over Weigel et al. in view of Burke (U. S: Patent 3,423,358). The arguments against Weigel et al. are repeated from above and apply equally here. Again, it is urged that Weigel et al. do not disclose a filler as discussed above. The Examiner agrees that Weigel et al. fails to disclose an organic filler that is precrosslinked to reduce its solubility, and thus the Examiner attempts to fill this void by citing Burk.

Burk discloses vinylic filler particles or pigments suited as a medium for dye absorption in films made from styrene, vinyl chloride, acrylates, polyethylene (col. 41, lines 41 to 44). Such films are not suited for producing seamless tubular films such as sausage casings, and they are neither cellulose-based nor produced by extrusion an aqueous NMMO spinning solution, wherein at least one protein is combined with at least one filler. Nothing in Burk teaches or suggests that an organic filler is pre-crosslinked to reduce its solubility in a NMMO spinning solution, as required by the present claim 10, or that an inorganic filler is insoluble in the NMMO spinning solution, as required by the present claim 11. Applicants therefore respectfully request the withdrawal of this rejection.

5) The Examiner next rejects claims 12 and 13 under 35 U.S.C. 103 as being unpatentable over Weigel et al. in view of Luo et al. (U.S. Patent 6,706,876 B2). The arguments against Weigel et al. are repeated from above and apply equally here. Again, it is urged that Weigel et al. do not disclose a filler as discussed above. The Examiner states that Weigel et al. fails to disclose a cellulose having the mean degrees of polymerization discussed in claims 12 and 13. The Examiner therefore attempts to fill this void by citing Luo.

Luo et al. teach a pulp which has a degree of polymerization from about 300 to about 1000, and which may be a high α-cellulose type. Luo et al. *do not* teach or suggest an aqueous NMMO solution containing cellulose, at least one protein and at least one filler, as recited by the present claims 12 and 13, which also depend from the present claim 1. If one of ordinary skill in the art were to provide the cellulose of Luo et al. in the product of Weigel et al., only a tubular film would be obtained which incorporates proteins in the cellulose, but which *does not* include a filler as required by the present claims as discussed above. Thus it is urged that it would not have been obvious for one skilled in the art to combine the teachings of Luo et al. and Weigel et al. in an effort to provide a cellulose which contains simultaneously proteins and fillers and has a mean degree of polymerization within the ranges of claims 12 and 13. It is urged that this ground of rejection should be rescinded.

6) Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weigel et al. in view of Bastioli et al. (U.S. Patent 5,412,005). Again, the arguments against Weigel et al. are repeated from above. The Examiner agrees that Weigel et al. fails to disclose cellulose comprising an organic filler comprising chitosan. The Examiner therefore attempts to fill this void by citing Bastioli et al.

Bastioli et al. teach biodegradable polymers such as cellulose comprising additives such as chitin and chitosan. However, there is no teaching in Bastioli et al. that a filler shall have a reduced solubility in a NMMO solution and that the cellulose is contained in an aqueous NMMO spinning solution, as required by claim 6 which depends from claim 1. It is urged that there exists no motivation for one skilled in the art to combine the teachings of Bastioli et al. and Weigel et al. in an effort to formulate the present invention. Applicants therefore urge that this ground of rejection should be withdrawn.

7) Claim 14 stands rejected under U.S.C. 103(a) as being unpatentable over Weigel et al. in view of Kastl et al. (U.S. Patent 4,741,938). The arguments against Weigel et al. are repeated from above and apply equally here. As stated above, it is urged that Weigel et al. do not disclose a filler as required according to the present invention. The Examiner states that Weigel et al. fails to disclose cellulose which is plasticized by glycerol and which has a residual moisture of about 8%. The Examiner therefore attempts to fill this void by citing Kastl.

Kastl ct al. teach a fiber-reinforced cellulose (col. 3, lines 36-37), which is plasticized by glycerol (col. 9,, lines 52-45) and which has a residual moisture content of about 7 % by weight (col. 9, lines 45-46) and not 8 %, as mentioned in the Office Action. Therefore one skilled in the art would not have recognized any advantage of providing for the plasticizer and residual of Kastl et al. in Weigel et al., since claim 14 relates to a residual moisture, or water content, of from about 8 % to about 24 % by weight. It is urged that it would not have been obvious for one skilled in the art to devise the invention of claim 14 upon a combined reading of Weigel et al. and Kastl et al. Thus, it is respectfully requested that this ground of rejection be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,

Richard S. Roberts
Reg. No. 27,941
P.O. Box 484
Princeton, New Jersey 08542
(609) 921-3500
Date: February 16, 2006

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office (FAX No. 571-273-8300) on February 16, 2006.

Richard S. Roberts
Reg. No. 27,941